



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,943	01/12/2005	Neville John Mattingley	MATTINGLEY-2682	4765
7590	06/02/2006		EXAMINER	
William H Holt Law Offices of William H Holt 12311 Harbor Drive Woodbridge, VA 22192				BERNSHTEYN, MICHAEL
		ART UNIT	PAPER NUMBER	1713

DATE MAILED: 06/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/520,943	MATTINGLEY ET AL.
	Examiner	Art Unit
	Michael Bernshteyn	1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-13 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action follows a response filed on March 15, 2006. Claims 1 and 9-13 have been amended.
2. Claims 1-13 are pending.

Claim Rejections - 35 USC § 103

3. The test of this section of Title 35, U.S.C. not included in this action can be found in a prior Office Action.
4. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable as obvious over Kronfli et al. (GB Patent 2 309 701) in view of Coowar et al. (US Patent Application Publication 2003/0170545) for the rationale recited in paragraph 2 of Office Action dated on November 15, 2005.
5. Claims 1-4 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable as obvious over Coowar et al. (US Patent Application Publication 2003/0170545) for the rationale recited in paragraph 3 of Office Action dated on November 15, 2005.
6. Claims 9-13 are rejected under 35 U.S.C. 103 (a) as being unpatentable as obvious over Coowar et al. (US Patent Application Publication 2003/0170545).

With regard to the limitation of instant claims 9-13, Coowar discloses that a lithium ion cell incorporates a porous polymer membrane, for example a microporous membrane and a method of making a lithium ion polymer cell comprising an anode layer, and a cathode layer each comprising respective lithium ion insertion materials, separated by a porous membrane, wherein the anode layer and the cathode layer each

incorporates a polymeric binder, the method comprising assembling the anode layer, the porous membrane, and the cathode layer, and impregnating the assembly with a solution comprising a lithium salt in a plasticizing solvent, the solution also comprising a polymeric material that is different from the polymer of the polymeric binder and that of the porous membrane, and is soluble in the plasticizing solvent (abstract, page 1, [0004]).

It is axiomatic that one who performs the steps of a process must necessarily produce all of its advantage. Mere recitation of a newly discovered property or function what is inherently possessed by the things or steps in the prior art does not cause a claim drawn to those things to distinguish over the prior art. Leinoff v. Louis Milona & Sons, Inc. 220 USPQ 845 (CAFC 1984).

Response to Arguments

7. Due to Applicants amendments of the claims 9-13, the rejection of the above claims under 35 U.S.C. 101 is withdrawn.
8. Applicants traverse the rejection of claims 1-7 under 35 U.S.C. 103 (a) as being unpatentable as obvious over Kronfli et al. (GB Patent 2 309 701) in view of Coowar et al. (US Patent Application Publication 2003/0170545) and the rejection of claims 1-4 and 6-8 under 35 U.S.C. 103(a) as being unpatentable as obvious over Coowar et al. (US Patent Application Publication 2003/0170545). Applicant's arguments have been fully considered but they are not persuasive.

9. Applicants contend that Kronfli et al. does not cast from a solution (cf. step c of claim 1). Rather, Kronfli et al. describes casting from slurry. Thus, on page 11, claims 11-21, the citation describes preparing a solution and then adding LiClO₄, ethylene carbonate, graphite, acetone and further NMP, followed by stirring and heating. This is described at line 17 as the "resulting slurry" and this is what Kronfli et al. cast and dry. It is inconceivable that the slurry gives rise to a porous polymeric membrane in the sense of the present invention (page 4, 5th paragraph through page 5, 1st paragraph).

10. In response to applicant's arguments it is worth to mention that there are no claims 11-21 on page 11, it is obviously lines 11-21 on page 11. Kronfli discloses that during composite electrode preparation PVdF-g-methacrylic acid graft copolymer and LiClO₄ were **dissolved** in **dimethyl acetamide** (DMA), and the mix was added to the **solution** whilst stirring. The mix became very viscous and **acetone** was added as a **diluent**. Then the mix was coated on a copper collector and left in the dry room overnight for the **casting solvents** (acetone and DMA) to evaporate (page 7, lines 6-16). Therefore, it is obvious the casting was made from a solution, not from slurry.

11. Applicants contend that Kronfli et al. does not describe holding the solution at a temperature of at least 40°C until the polymer is completely solvated as recited in step b of claim 1. Kronfli et al merely state that NMP and DMA were added "to dissolve" the PVdF (page 11, line 13). They clearly have no appreciation of the criticality and importance of the condition of this step, and there is nothing to suggest that, in Example 3, they achieved complete salvation (page 5, 2nd paragraph).

12. In response to applicant's arguments it is worth to mention that Kronfli discloses the process comprising the following steps: dispersing PVdF in a small amount of methanol (non-solvent) to which N-methyl pyrrolidone (NMP) and dimethylacetamide (DMA) were added to dissolve the PVdF; then the mixture was stirred and heated. The resulting slurry was cast onto a copper foil current collector and dried in a vacuum oven **for 24 hours at 50⁰C** (Example 1, page 5, line 35 through page 6, line 23) to evaporate the non-solvent and solvent and to obtain a membrane (Example 3, page 11, lines 1 through page 12, line 3). Additionally, Kronfli discloses that during the electrolyte preparation the prepared solution was poured into a glass Petri dish and left in a dry room **for 5 days for casting solvent** (the DMA) to evaporate, leaving an electrolyte film (page 6, lines 32-34).

Therefore, In the absence of criticality in the specification (see Example 1, page 10, lines 17-23) of achieving and determination of the complete salvation, it is the examiner position to believe that method of composite electrolyte preparation and cell fabrication characterized by exactly the same ingredients, solvents and the same sequence of processing steps in GB'701 (Example 1, page 5, line 35 through Example 5, page 14 line 30) would be substantially identical to the instant claimed method of making porous polymer membrane comprising vinylidene fluoride.

13. Applicants contend that Kronfli et al. citation contains five examples that describe casting of PVdF-containing mixtures. All involve mixing the polymer, various solvents and sometimes, other ingredients, stirring and heating the mixture and then casting to form a film. In only one example (Example 3) is dispersion in a non-solvent made before

Art Unit: 1713

adding a solvent. Kronfli et al. therefore ascribe no particular significance to Example 3, the use of methanol therein, stated to be in a "small" volume (i.e., not quantitatively in contrast to claim 1, amended as above), would be regarded by skilled reader as merely incidental description (page 6, 2nd paragraph).

14. In response to applicant's arguments it is worth to mention that the amended claim 1 recites that the **proportion of non/solvent is 2 to 30 wt%** in a solvent/non-solvent mixture. In Example 3 Kronfli discloses that 3.0 g PVdF was dispersed in a small volume of methanol to which 14.5 g N-methyl pyrrolidone (NMP) and 20 cm³ dimethyl acetamide (DMA) were added to dissolve the PVdF (page 11, lines 11-21).

Therefore, Kronfli's "small volume of methanol, which is non-solvent, very well met the claimed amount 2 wt% of non-solvent in a solvent/non-solvent mixture.

15. Applicants contend that Coowar et al reverse the order of addition of solvent and non-solvent defined in step (a) of claim 1 (page 6, 3rd paragraph). In fact Kronfli does not mention membrane porosity, and any occurrence thereof in carrying out the teaching of Kronfli et al. would be purely incidental. The Kronfli et al. citation is directed towards polymer chemistry, i.e., improving polymer properties by grafting a mono-unsaturated carboxylic acid, ester or amide thereon. Coowar et al. is directed to providing physical properties in a porous membrane. Therefore, there is no reason why the person of ordinary skill in the art should contemplate substituting octanol (as described in Coowar et al.) for methanol (in Example 3 of Kronfli et al.) if he or she wished to obtain membranes of controlled porosity (page 6, 3rd paragraph through page 7, 2nd paragraph).

Art Unit: 1713

16. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Kronfli discloses a process for producing a porous polymeric membrane suitable for use in electrolyte material. A polymeric chain consisting primarily of vinylidene fluoride, onto which is grafted a mono-unsaturated carboxylic acid, ester, or amide. This may be used as electrolyte in a lithium cell, or may be combined with an insertion material to make a composite electrode for such a cell (abstract). Coowar discloses that a lithium ion cell incorporates a porous polymer membrane, for example a microporous membrane (abstract). Therefore, both references belong to the same field of endeavor concerning the obtaining porous membrane for cell.

17. In response to applicant's argument that there is no suggestion to substituting octanol (as described in Coowar et al.) for methanol (in Example 3 of Kronfli et al.) it is worth to mention that Coowar clearly discloses that such a microporous membrane may be cast from a solvent/non-solvent mixture, or from a latent solvent. The non-solvent should not only dissolve in the solvent, but it should be miscible with the solvent in substantially all proportions. **The boiling point of the non-solvent is preferably higher than that of the solvent**, preferably about 20⁰C higher. For example, the

Art Unit: 1713

solvent might be **dimethylformamide**, or **dimethylacetamide**, in which case a suitable non-solvent is **1-octanol**, which soluble in those solvents and this boiling point is about 194⁰C. Alternative non-solvents would be 1-heptanol, 2-octanol, 4-octanol or 3-nonal, which have the poling point between 175⁰C and 193⁰C (page 2, [0009]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the non-solvent **octanol**, which has the boiling point **higher than** the solvents **dimethylformamide** or **dimethylacetamide**, as taught by Coowar in Kronfli's process for producing a porous polymeric membrane, because the entire process can be carries out in the absence of water or humidity, reducing the risk of water being present in the final film or membrane, which would be detrimental to the properties of a lithium cell (US'545, page 2, [0009]).

18. Additionally, Kronfli clearly discloses that non-solvent (methanol) was added prior to the addition of the solvent (DMA), so there is no need the change the order of steps, which is within limitation of instant claim 1.

19. In the light of the discussion above, the rejection of record has not been withdrawn. The rejection remains in force.

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

Art Unit: 1713

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Bernshteyn whose telephone number is 571-272-2411. The examiner can normally be reached on M-F 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael Bernshteyn
Patent Examiner
Art Unit 1713

MB
05/22/2006

DW
DAVID W. WU
SUPPLYORY PATENT EXAMINER
OLOGY CENTER 1700